DOCUMENT RESUME

ED 347 645 EA 024 087

AUTHOR Rugh, Andrea B.; And Others
TITLE Teaching Practices To Increase Student Achievement: Evidence from Pakistan. BRIDGES Research Report Series, No. 8.
INSTITUTION Harvard Univ., Cambridge, MA. Inst. for International Development.
SPONS AGENCY Agency for International Development (IDCA), Washington, DC.
PUB DATE Mar 91
CONTRACT DDP-5824-A-5076
NOTE 41p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Achievement; Foreign Countries; *Instructional Effectiveness; *Instructional Improvement; Intermediate Grades; Professional Development; *Teacher Effectiveness; *Teacher Improvement; *Teaching Methods
IDENTIFIERS BRIDGES Project (Harvard University); *Pakistan

ABSTRACT

Findings of a study that described effective teaching practices in Pakistan elementary schools and made recommendations for improving teacher effectiveness are presented in this paper. The research project was conducted by Basic Research and Implementation in DevelopinG Education Systems (BRIDGES) of Harvard University (Massachusetts). During 1988-89, a total of 63 fourth- and fifth-grade teachers were observed in 32 schools, teaching a total of 265 lessons. The teaching practices of teachers whose students had better achievement test scores than those of other students were compared. Findings indicate that effective teachers were more likely to use systematic logical sequences, which involved implementing synergistic practices, variety, and feedback and monitoring; adapting to their contexts; organizing instructional time; creating an orderly environment; and facilitating independent learning. Policy recommendations are made to formulate a clear statement of objectives; review assessment practices; provide teacher incentives; improve the quality of learning materials; offer practical inservice training; and provide instructional leadership. Seven tables and 17 endnotes are included. (18 references) (LMI)

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Teaching Practices to Increase Student Achievement: Evidence from Pakistan

Andrea B. Rugh

With
Ahmed Nawaz Malik
and R. A. Farooq

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Basic Research and Implementation in DevelopinG Education Systems

A project of the Harvard Institute for International Development,
the Harvard Graduate School of Education,
and the Office of Education, Bureau for Science and Technology,
United States Agency for International Development

The Basic Research and Implementation in DevelopinG Education Systems Project (BRIDGES) is directed by the Harvard Institute for International Development and the Harvard Graduate School of Education, under Cooperative Agreement No. DDP-5824-A-5076 with the Office of Education, Bureau for Science and Technology, United States Agency for International Development. Also participating in the Project are the Institute for International Research, Michigan State University, the Research Triangle Institute, and Texas Southern University.

The BRIDGES Group includes educators, researchers, planners and policymakers committed to improving opportunity and quality in Third World schools. The goal of their collaborative effort is to identify policy options that will increase children's access to schooling, reduce the frequency of early school leaving and repetition, improve the amount and quality of what is learned, and optimize the use of fiscal and educational resources.

The *BRIDGES Research Report Series* is edited by the Harvard Institute for International Development. The *Series* is a collection of reviews of the state-of-the-art in research, and original research reports on basic education in developing countries. Each review summarizes research about a particular policy issue and suggests policy options. Original reports on BRIDGES-sponsored research present new information about the impact and costs of specific alternatives that the reviews have identified as most promising.

The views expressed in this document are those of the author and do not necessarily reflect those of the United States Agency for International Development.

BRIDGES RESEARCH REPORT SERIES March 1991 No. 8

Teaching Practices to Increase Student Achievement: Evidence from Pakistan

Andrea B. Rugh

With Ahmed Nawaz Malik and R. A. Farooq

Foreword

The study reported in this paper has five special features.

- Its research was designed after a comprehensive review of teacher practices throughout the world that are associated with high levels of student learning.
- This review led to the development of a generalizable model of effective classroom practices.
- Various methods were used to record classroom practices and assess student learning in Pakistan.
- This report summarizes results as general principles rather than as recommendations for specific interventions.
- This qualitative study is linked to a large scale sample survey that permits validation of findings on a national level.

Review of Relevant Experiences

There is a yawning gap in the amount of knowledge about teacher practices in early-industrialized countries as compared to later-industrializing countries. For example, the research in the United States on classroom practices of teachers is so extensive that several lengthy volumes are filled with **summary reviews** of this research, while no more than 100 original studies on classroom practices are listed in the REDUC bibliography of education research in Latin America, the largest single collection for a region of the Third World.

It is not always useful to make generalizations from research in rich countries and apply them to poor countries. While the education systems in both settings are formally similar—e.g., each has teachers, classrooms, textbooks, schoolhouses—the context and dynamics of the teaching-learning process may differ in fundamental ways. What may be a problem in one setting—for example, the fact that many teachers are deficient in their knowledge of the subjects they teach, even in primary grades—may be unknown in countries where all teachers have a university degree, and the problem is **understanding** how to teach the subject, rather than basic knowledge of the subject.

We do know that there are differences between countries in the **level** of performance in the teaching/learning process. This is shown in studies of inputs to the process, such as those that examine the differences between systems in time spent on instruction, unit expenditures per student, class sizes, amount and quality of teacher training, availability of textbooks, etc. It is also shown in studies of outputs. For example, the series of International Educational Achievement studies show marked national differences in average student knowledge of curriculum.

The main problem, however, with making inferences from industrialized country studies about what should be done in later-industrializing countries is that we are not certain whether the linkages between inputs and outputs are the same in all education systems. That is, we are not certain whether the **process** by which students learn is the same across systems. If it is, if all students learn the same way, and there is one best way of teaching, then it makes sense to carry out research across countries to determine the ideal mix of inputs, and then to set inputs in all countries at that ideal level.

It is not always useful to make generalizations from research in rich countries and apply them to poor countries.

If there is no one best way of teaching, but instead several fundamentally different ways, each with its own best mix of inputs, then comparisons are only possible between countries that teach in the same ways.

Development of a Generalizable Model of Teaching

In designing this research the authors developed a general model of effective teaching intended not as an original theory, but as a synthesis of previous research. The model was not built through a statistical meta-analysis, because emphasis was not on using empirical findings from other studies to extract statistical regularities. Instead, emphasis was placed on weaving together the strands of experience across contexts and countries to tell a convincing story of what teachers do that leads to student learning.

The authors were impressed with findings from the International Educational Achievement studies that effective teachers vary their teaching methods, often using a variety of methods each day. There is no one set of methods that is universally best. Instead good teachers pick and choose. This variation is not haphazard, however; good teachers observe how their students respond to the material that is presented, taking into account both individual moods, collective social climate, and instructional materials. Teachers manage their resources in response to varying situations.[1] How, then, is it possible to present a general model of effective teaching?

What Rugh and her co-authors did was to focus on those kinds of teaching activities that are most important to student learning, activities that appear most frequently in the repertoire of good teachers. In the process they de-emphasized attention to details of behavior, e.g., frequency of smiling, warmth of expression when speaking to children, etc. Fortunately for policymakers, these teaching characteristics are largely determined by differences in personality—we know little or nothing about how to select teachers by observing how often they smile.

The authors instead focused on those behaviors that can be influenced by school administrators and supervisors, by teaching guides, by in-service and pre-service training, by discussions among colleagues in teacher meetings.

Use of Various Measures of Effectiveness

The study used several methods to identify "effective" and "less effective" teachers. Supervisors indicated which schools in their zones had the best reputations. Schools in Pakistan are small. Most have only one or two teachers. Supervisors often identify schools by teachers. Schools were also ranked according to the proportion of children passing the end of year examination. A national curriculum-based examination for mathematics and science was given to children, and scores were averaged. The authors comment on the variations in the meaning of "effective" using these different measures.

Teaching behavior was "observed" using self-report forms filled out by teachers and by observers who were present in classrooms. Although this method is relatively costly, since it requires many hours of work by trained researchers, it does provide a means that could be used in teacher or supervisor training. The method could also be used to improve the observations teachers make of themselves and of their students.

Statement of Principles rather than Hard and Fast Recommendations

The outcomes of educational research are often disappointing for those who want highly conclusive results. Speaking in technical terms, most education studies generally account for less than half of the variance in student achievement scores; that means that most of the achievement differences between students are left unexplained.

This occurs in part because the outcomes of education are much more complex than those of other disciplines. The economist can measure gains in sales or units of production precisely. Values or knowledge or skills are not as tangible, and therefore measurement fails to describe the changes that teachers can produce. Also, the teaching-learning process is more complex than that which leads to increased sales or units of production. Salesmen and workers on the production line do not vary their methods and maintain high outcomes, but teachers do. Learning is enhanced when a teacher varies the method of presenting material.

The range of variation in clients or in raw material for production is relatively small. Education studies, however, show that the largest single source of variation in learning outcomes of individual students are the students themselves, not their teachers, schools, communities, or region. A given teacher confronts almost as much variation in students (abilities, interests) in a single class, as would be found in the whole school or district, making the teaching process that much more complex.

It follows, then, that specific recommendations, "do this, do that," are less useful than statements of

principles that give policymakers and teachers a way to respond across a variety of contexts.

Linkage of this Study with Other Studies of Teaching and Learning

Planning for this study and others in this project began in the fall of 1987 as a joint project of the Academy of Educational Planning and Management, the Federal Ministry of Education, and BRIDGES. The overall objective of the project was to identify those educational innovations in Pakistan that had proved successful and therefore should be encouraged.

The project called for intensive observation in schools and district offices to identify issues and innovations that appeared promising. Research questions and methods tried out in the ethnographic or qualitative research would generate local findings with limited generalizability. But they would also form the basis for the design of a national sample survey of schools that would permit generalization at a national level.

In addition to the qualitative research described here, during 1986 and 1987 BRIDGES and Academy staff carried out more than 100 interviews with federal and provincial officials about the success of various innovations and obstacles to innovation.[2] Other interviews were carried out in 1988 with district supervisors on assessment methods, with parents and local officials on their reaction to using mosques as sites for primary schools,[3] with district education officers on financial procedures, and with provincial officials on planning.

The field work for the study reported here was completed in the fall of 1988. Experiences in the field contributed to the design of instruments and procedures for the national sample survey, which began in December, 1989. The initial findings of the study reported here contributed to the design of the analysis of the national sample survey. In turn, as the findings of that more representative study became available, they suggested questions to be asked of the data collected through school observation.

No argument is made in this study that the results reported are generalizable to all schools in Pakistan, let alone to schools and teachers. The model for effective teaching that is presented here is offered not as a solution, but as a way to identify problems; it serves as a source of ideas that policymakers and teachers can use in their efforts to construct those particular solutions that match their specific realities.

Noel F. McGinn
March 7, 1991

Notes

1. See Martha Montero-Sieburth, "Classroom Management: Instructional Strategies and the Allocation of Learning Resources," RRS #4. Harvard University, Project BRIDGES, 1989.

2. The results of this study are available in Warwick et al., "The Implementation of Educational Innovations in Pakistan: Cases and Concepts," BRIDGES Casual Paper, 1989.

3. The results of this study are available in Anderson et al., "The Impact of the Mosque Schools Policy on Girls' Access to Education," BRIDGES Casual Paper, 1989.

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Executive Summary

This paper indicates how to improve the quality of primary school programs in countries with conditions similar to those in Pakistan. It reports the results of a study of effective teaching practices carried out in Pakistan in 1988 under the BRIDGES project of the Harvard Institute for International Development. The objectives of the study were 1) to describe teaching practices used by teachers whose students performed better on achievement tests than other students in the sample, and 2) to present recommendations for improving teacher effectiveness.

A practical problem in improving quality is identifying where changes will have the most impact. All components that affect classroom learning—facilities, curriculum, instructional materials, teacher training, and student assessment—may need improvement. Student learning can be improved best by making teacher performance more effective. The teacher is the person most responsible for organizing classroom resources, implementing educational goals, and interacting with students. The study, therefore, identifies teaching practices associated with higher student achievement, and suggests how other components of the educational system might be minimally modified to support this teaching model.

The teacher is the person most responsible for organizing classroom resources, implementing educational goals, and interacting with students.

The "effective practices" observed in the study are those that teachers, building on their own experiences as students, work out to cope with conditions they find in classrooms. Most of these practices are not taught in formal training courses. They are similar, however, to practices that international research suggests will be effective for teaching simple performance skills and subject matter content.

Altogether, a total of 63 grade four and grade five teachers were observed teaching 265 lessons in 32 schools across Pakistan. These grades were chosen because national achievement tests exist for them that could be used as a teacher performance measure. Though achievement scores as a whole were low, students of effective teachers scored approximately twice as high as students of less effective teachers and had lower dropout and repetition rates. The study assumes that teachers who produce higher achievement in their students are expert practitioners who, intuitively or otherwise, have worked out ways to get more out of their students and out of the resource context in which they work. It is their comprehensive package of instructional practices that is considered important as a model of effective teaching. The package includes practices used by a majority of effective teachers (and sometimes also less effective teachers) as well as practices which discriminate between the two samples.

General Findings

Effective teachers are more likely to use *systematic logical sequences* in teaching. One such sequence includes review, preliminary statements to focus student attention, presentation of new materials, guided practice, independent practice, and added practice with homework. Effective teachers tend to use a more complete set of these behaviors than less effective teachers.

Effective practices are *synergistic*. Isolated practices, no matter how effective in themselves, do not appear to be as effective as a package with as many of the key elements in it as possible.

Variety is useful in reinforcing learning. A single practice or task contributes to learning up to a point in a lesson, after which it loses its potency. Even seemingly sterile activities such as "copying" can be helpful when supplementing other ways of learning.

Learning is a *contextual* phenomenon. Effective

practices in one subject or setting, or with one type of teacher, may not work well in another. The paper describes these differences. Effective teachers adapt practices to the conditions in which they teach.

Effective teachers seem to be aware of the *learning implications* of instructional practices. All practices that are repeated in the classroom have implications for who learns and how much is learned.

Effective teachers organize available *instructional time* so that students spend as much time as possible directly engaged in learning tasks. The teacher can use time productively by appropriate scheduling, by the kinds of tasks assigned, by proportioning time on learning activities in ways effective to the subject matter, and by being absent, and encouraging their students to be absent, as little as possible.

Effective teachers use *feedback* to reinforce learning, and to help children feel they can successfully complete school work. *Monitoring* is best when teachers give students individual help.

Effective teachers create an *orderly environment* for learning with rules that are understood and automatically followed by students so learning is not interrupted by distractions.

Effective teachers give children opportunities to be *independent learners*.

Policy Recommendations

Lasting improvement in student learning requires that teachers perform well, *and* that all components that affect teaching/learning work effectively and efficiently toward the same goals. In addition to a core of effective teaching practices, the recommendations suggest the components necessary to support effective teaching. An effective learning program includes the following components.

Education authorities need a well-formulated and clear *statement of the objectives of the education system*, elaborated in enough detail that their implications can be carried out in the classroom. Without this clarity, good teachers can only ensure that children perform well on existing tests of the system.

Assessment practices need to be thoroughly reviewed to see if they meet the needs of the program. Tests drive the system and help determine what children learn and teachers teach. Effective assessment 1) allows teachers and planners to know if children are learning what they are supposed to learn, 2) permits resources to be allocated where needed to strengthen programs, and 3) motivates teachers to improve student learning.

Improving the quality of *learning materials*, such as textbooks, is an important ingredient in improving instruction. In Pakistan, instructional materials need to 1) be less teacher-dependent, 2) bear some of the burden for teaching skills that are lacking, and 3) be well-sequenced, simple, and appropriate to children's ages.

Teachers need *incentives*, such as status and professional or merit recognition, for bringing their students to a high level of learning. When there are no obvious consequences of their actions, few teachers feel motivated to perform well. Diagnostic tests in annotated texts are a first step, but teachers and students also need recognition from sources outside their schools.

Program improvement can start with *short, practical methods courses* for pre- and inservice training to teach effective practices. These courses should be accompanied by *support materials*, such as annotated lesson plans to reinforce the use of the practices in the classroom. The courses should be attended by *teachers, supervisors, and managers* for consistent focus. The course should be tested for impact on student learning before disseminating broadly.

Support materials, such as teacher guides, simple charts, and practice materials help make teaching easier. Annotated texts, using effective teaching practices, can ensure a more uniform quality to teacher performance. Notes in the margin tell a teacher exactly what to do when conducting review, explaining objectives, presenting new material, conducting guided and independent practice, assigning homework, giving diagnostic tests, reteaching, and providing enrichment tasks for faster students.

Sufficient *instructional time* needs to be made available to teachers, and some system devised to ensure that local authorities do not arbitrarily cut back that time. There need to be *stable teacher and student attendance patterns* to extend the time available for instruction. Teacher absenteeism can be reduced by appointing teachers closer to their homes, increasing supervision over them, and keeping permitted leaves to a minimum.

Instructional leadership needs to be invested in designated personnel with clearly defined roles and responsibilities: headteachers who supervise teachers daily, supervisors who visit schools periodically with resources to assist weak programs, and central-

ized planners who use school learning results to allocate resources over broad geographical areas. The managers need training in how to support effective learning in classrooms. Annotated texts can be used by supervisors as observation protocols to know immediately whether effective practices are being used.

Most of the recommendations call for improvements in components already existing in educational programs. With strong leadership, many could be accomplished simply by using available resources more effectively. The main goal of the reforms is to focus all elements of the educational system, including teaching practices, more clearly on learning outcomes.

Section I: Introduction

This paper suggests an approach to improving the quality of primary school programs in countries with conditions similar to those in Pakistan. It reports the results of a study of effective teaching practices carried out in Pakistan in 1988-89 under the BRIDGES Project of the Harvard Institute for International Development. The objectives of the study were 1) to describe teaching practices used by teachers whose students performed better on achievement tests than other students in the sample, and 2) to present recommendations for improving teacher effectiveness.

Issues in Improving Program Quality

There is still a great deal to be learned about the utilization of educational resources under varying social and cultural conditions. Instructional strategies from developed countries are not necessarily effective in developing countries. Qualitative research since the 1960s has shown that the social and cultural environment has a profound effect on the teaching/learning context (Montero-Sieburth, mimeo. 1988: 6), but little has been done to develop a concrete model of how this might be taken into account when making qualitative improvements in an educational program. How might such a model look? To what extent would it be generalizable to an entire nation's system or to other developing systems of a similar type, and to what extent must it be adapted to specific contexts and personnel? What are the cultural constraints that limit the adoption of models from outside sources? Tye (1987) points out that schools can be very alike in many ways and very different in others; she attributes the likenesses to the deep structure of schooling—the cultural assumptions about learning.

Two kinds of research in developed countries have attempted to identify school and teacher factors that affect student achievement: school effectiveness and production function studies. Though their sets of particularized conclusions are illuminating, these studies do not offer much guidance for general improvements in national education programs in the developing world. Other criticisms have been leveled at these studies for not tying together context, teacher characteristics, the learning process and the kind of product, and for including some factors while not explaining why others are excluded.

One writer has defined educational quality as a function of "(a) the level of material inputs allocated to schools per pupil (resource concentration), and (b) the level of efficiency with which a fixed amount of material inputs are organized and managed to raise pupil achievement" (Fuller 1985:23). Fuller's definition stresses raising achievement as the operational objective of quality improvements. While this notion of quality is limited, and many complex issues are avoided when achievement is the only indicator, it may be the most promising route to follow when initiating an improvement program. In the short run, until the meaning of quality is better articulated, raising achievement (and thereby lowering repetition and dropout) means increasing children's ability to pass existing exams and, therefore, implies that children learn more of what school systems presently teach.

...until the meaning of quality is better articulated, raising achievement means increasing children's ability to pass existing exams...

In developing countries, efforts on all fronts, including research, need to focus on what is immediately useful. Though input-output models have been criticized extensively, no one has come up with a better way to extract the information for efficient policy planning, monitoring, and large-scale evaluation. One problem with exclusive use of this approach, however, is that it masks inexpensive modifications of what already exists that might improve efficiency. Because of these problems, many have called for a more intensive examination of what goes on in classrooms to understand better how inputs to the classroom can be translated into successful outputs.

Section II: The Effective Practices Study in Pakistan

Objectives of the Effective Practices Study

From studies that identify specific problems with educational programs in Pakistan and from past experience with efforts to solve these problems (see Warwick, et al., 1989), it is apparent that solutions to low program quality need to be relevant to the actual classroom conditions. They also need to be comprehensive and coordinated so that "repair" on one side does not cause disfunction on the other.

Given these needs, the first step in an improvement program is to identify a point around which changes might be organized. The present study assumes that the first effort in improving student learning is to improve teacher performance and the best way to do this is to identify teachers who are already performing well in Pakistani classrooms. The study, therefore, seeks:

...the first effort in improving learning is to improve teacher performance and the best way to do this is to identify teachers who are already performing well...

- to identify effective teaching practices that, if replicated in training courses, might lead to higher student achievement; and
- to suggest the supports (such as supervisory backup, instructional materials, etc.) that would make it possible for this teaching model to operate effectively.

In this study, teacher practices "refer to a set of strategies, procedures, activities, and rules that are teacher-directed for the purpose of ensuring the optimum level of students' opportunity to learn". This approach assumes that teachers can control their students' behavior and that learning proceeds through sequential strategies such as lecturing, questioning, recitation, seat-work, and grouping that are employed over time and are intended to achieve desired learning outcomes. (Doyle, 1986 in Montero-Sieburth 1988: 3, 4).

Study Design

The study to be described used an eclectic design, combining the strengths of various methodologies. At the core were qualitative descriptive data, backed by systematically collected information on a range of specific practices. The latter made it possible to provide parallel coverage of each classroom and served as a validity check on the descriptive materials. These statistical data were analyzed in simple frequency tables as supportive evidence of the differences observed in the practices of effective and less effective teachers.

Sample

A purposive sample was comprised of comparison groups of "effective" and "less effective" teaching in the three main subjects taught in Pakistani schools — Urdu, math, and science. The sample was chosen by first selecting one district in each of the four provinces for its middle range character (neither extremely remote nor containing the major urban center of the province). We assumed that middle range districts from all four provinces would afford reasonably typical examples of Pakistani schools.[1] Next, district education officers or supervisors who knew the schools were asked to rank them on a scale of one to five based on the quality of instruction. From this ranked list, a sample was chosen that included the most and least effective girls' and boys' schools in urban and rural locations. Schools that did not contain the full five grades of the primary level, as well as those with grade five classes that had less than five students (a number considered minimal for achievement testing, yet low enough that small schools might be included in the sample) were excluded. After this first cut, the list contained 32 schools, with 8 from each district, including for each sex:

- an urban effective school
- a rural effective school
- an urban less effective school
- a rural less effective school

The urban/rural dimension was considered a proxy for major variations in resources; effective/less effective was considered a first cut in identifying "good" and "poor" teaching; and gender was important because of the largely[2] separate systems for males and females in Pakistan.

It was necessary to deviate from these categories in two cases, first in Balochistan where, in the subdistrict of Harnai, there were no girls' schools that, strictly speaking, could be called rural, and it became necessary to take the universe of girls' schools with grade five classes in that district. Second, in Punjab, the researchers observed the female section of a school, which in the records had appeared as a boys' school, because the boys' section did not have the requisite minimum number of fifth graders. Thus the balance planned for the sample was disturbed by one extra urban and one extra girls' school. The sample, in any case, was not designed to be representative of these various categories but to give a minimum number of middle range schools that by reputation were the best and the poorest examples existing within that range.

Altogether a total of 63[3] grade four and grade five teachers were observed in these 32 schools, teaching a total of 265 lessons. Grades four and five were chosen because of the availability of testing measures for these grades.[4] It was intended that the researchers see two Urdu, two math, and two science lessons for each teacher. If that had been possible there would have been 126 observations in each subject. Many teachers, however, only taught science occasionally or left some subjects untaught on short school days. Table 1 shows the number of cases in each breakdown of the sample.

Table 1: Sample observations

Type of class observed	Number of cases
Total sample	265
Location	
urban	151
rural	114
Grade	
four	126
five	139
Grade levels	
single	188
multi	77
Subject of instruction	
Urdu	106
math	106
science	53
Gender of teacher	
male	131
female	134
Effectiveness of teacher	
more effective	132
less effective	133

The Pakistani Experience

Pakistan's educational problems are similar to those in many developing countries—low literacy (26 percent of those age 10 and over) and low primary school participation rates for boys (54 percent) and girls (29 percent).[1] Those rates vary overall between a high for urban boys (91 percent) to a low for rural girls (27 percent). In the province of Balochistan, where education is least developed, perhaps no more than 1 percent of rural girls enroll. In recent years, because of high population growth rates, the numbers of out-of-school children are increasing. The major part of the education budget is now spent on recurrent costs with little left over to expand further or to invest in major improvements. No matter how large the infusion of funds in the near future, from increased GOP and foreign donor contributions, it is inevitable that economies will have to be made in the way funds are currently used, simply to keep up with population growth.

Dropout is a major problem; only about half of the children who enter school complete the primary level. Dropout rates range from a low for males in Punjab (18 percent) to a high for girls in Balochistan (93 percent). Only about 4 percent of rural girls remain in school by the age of 12.

The National Education Council (NEC) in Pakistan identified a wide range of factors that contribute to the dropout problem. Those specifically related to the classroom include the inadequate facilities, the disciplinary methods of teachers, the length of the school day, grade repetition, beginning formal instruction on the first day, language problems, children's learning problems, overcrowded classes, the difficulty and lack of relevance of the

continued on next page

curriculum, the rigidity of the examination system, poor administration and supervision, untrained teachers, a lack of textbooks, high student-teacher ratios, and poorly motivated teachers (Bhatti, et al., 1985, pp. 66-69). The World Bank, in a recent Education Sector Strategy Report, concluded that, if literacy levels are to be increased, future measures to keep children in school will be as important as measures to draw more children into the school system.

Almost every education planning document since 1947 has noted the serious problem of dropouts. The Commission on National Education in 1959 implied that the problem might be solved if education were made compulsory up to grade five by 1969. The 1970 New Education Policy document also expressed alarm at the high dropout rates. That document called for more attractive schools to motivate children to remain in school. A 1972 document called for revision of curricula and texts, and a 1979 document called for improved facilities, better supervision, and new ways of recruiting teachers. All the five year plans since 1960 have called for qualitative improvements in the education program, sometimes stressing the quality of the school environment, at other times emphasizing instructional materials, teacher training, or supervision to reduce the high dropout rates.

Facilities are minimal in most Pakistani schools. The majority of classes are multigrade, and the number of children in any class can vary from exceedingly small numbers in the fifth grade to up to 100 in the early, often combined, pre-primary and first primary class. Buildings are rarely adequate for the numbers of enrolled students, especially in Balochistan where it is the rule to provide two rooms for a five grade school. Classrooms in the rural areas are frequently equipped with only a blackboard, chalk, teacher desk and table, but with no student desks, and few if any charts or other instructional aids. Teaching kits, which were provided to many of the schools, are not used because teachers feel that in using them they are diverted from what they should be teaching: the textbook. A bright point is that in most areas, sufficient textbooks exist, and, in Balochistan, rural and poor urban children are provided textbooks free. However, instructional materials are considered so difficult for the early years that it is standard for children to spend at least two years completing grade one. The difficulty of the materials, the numbers and varying abilities and ages of children in many classes, and the often harsh discipline are some of the factors considered responsible for the high dropout rates in the early years of primary school.

Teachers are poorly paid and often poorly motivated. There is high absenteeism on official (which may account for 25 percent of the school year) and unofficial leave. Though teachers usually have 10 years of general academic training, a good number do not have preservice training, especially in Balochistan where all teachers are hired directly as untrained teachers. Few receive inservice training and not on a regular basis. A BRIDGES survey of approximately 500 schools has shown that, in any case, it is the length of academic training and not preservice teacher training that has an impact on student achievement.

In general the criticisms levelled at teacher training programs include the low academic qualifications of the entrants, the lack of practical training, the emphasis on theoretical knowledge, the inadequate preparation in subject skills, the inadequate time provided for the training (officially nine months but with holidays and late starts usually three or four months), and the trainers' lack of experience not only in training teachers but in primary school teaching. Difficulties in providing sufficient staff, time during training, and appropriate school locations deter efforts to implement the present requirements of supervised practice teaching. Perhaps more important, teacher training has a well-established institutional presence in Pakistan that resists major reform efforts.

In most provinces, candidates for teaching positions are the least capable graduates, and teaching is a last resort when they can find no better employment. In others, such as Balochistan, it is difficult to find teachers, especially women, who are willing to teach in rural areas. Academic qualifications of candidates may be lowered to permit recruitment of local teachers in these difficult areas. Efforts now underway to relax the residence requirements of Balochistan (so teachers can be recruited from provinces where there are excesses of candidates), creates the new problem of bringing into the system teachers who may share no common language with local populations.

Pakistan has experimented with a number of policy alternatives to improve the quality of the educational program. The most important of these are the recruitment and training of learning coordinators to improve the supervision of instruction, the creation of resource center schools to provide more support for classroom teachers, and the development of an integrated curriculum that reduces the number of separate subjects and textbooks, of teaching modules with activities for teaching lesson concepts, and of teaching kits containing instructional aids for classroom use. None of these has proved completely successful, nor has implementation been smooth.[2]

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1. These are 1984 estimates from the World Bank Development Report 1987. This report notes that participation rates have barely been maintained (2 percent increase) in the last 20 years, and with a 3.1 annual average population growth, the numbers of out-of-school children have increased.

2. See Warwick, D., Reimers, F., and McGinn, N. "The Implementation of Educational Innovations in Pakistan: Cases & Concepts." BRIDGES casual paper, 1989.

Method

Teams of researchers (three male and three female researchers for respective girls' and boys' schools) spent three days in each school collecting inventories of school, teacher, and classroom characteristics, observing fourth and fifth grade teachers during math, Urdu, and science classes, and noting the amount of time spent in various activities in the classroom.

On the first day in a school, researchers gathered background information about the school and administered a teacher questionnaire. The main purpose of this initial period was to establish rapport with the staff to allay their fears about the study. Though it is unlikely that teachers behaved entirely normally during the observation period, they seemed much more relaxed by the third day. Since a main purpose was to identify exemplary practices that might be replicated, we were not unhappy observing the practices that many teachers offered as the best in their repertories. Some teachers, however, may have been so nervous that they taught less well than usual. Within the limits of the study there is no way to know what effect the observers' presences had on the teaching.

On the second and third days, the researchers made classroom observations and timed specific teaching behaviors. The morning period was observed from the opening assembly to the break, during which time each teacher had usually taught at least one period of Urdu and math and often science. After the break, when many teachers turned to independent practice or other less formal classwork, the researchers administered the academic achievement tests, one on each day and, when the class was large enough in grade five, a portion of the fifth grade children took the science exam each day so that there would be measures for each of the subjects without requiring any child to take two exams in a day.

During classroom observations, researchers filled out prepared protocols describing teaching behaviors. In order to facilitate observation, teaching practices were grouped by categories, and then each category was broken down into practices that were exhaustive to the setting and to the larger category. The gross categories were identified during several weeks of preliminary observation in Pakistani classrooms. They included review, preliminaries, presentation, guided practice, independent practice and homework, and "other instructional" and "non-instructional" activities to "exhaust" the possibilities.

Part of the reason for systematizing the data collection was the difficulty, in such a short time, of training researchers to make the detailed qualitative observations necessary for comparing the teaching practices of a number of teachers. The limitation of this approach is that it may direct attention to certain factors and exclude others. As a partial check on this problem, an "other" category was added to pick up variations outside the "mainstream" behaviors found in most classrooms. In addition, a description of the instruction and its setting was made in each classroom by a Pakistani researcher trained in anthropological observation skills.

During the training period, researchers' observations in the same classrooms were compared to ensure that they defined the categories in reasonably similar ways.

Measures of Effectiveness

Four measures were used to rank teacher effectiveness. The first was the subjective ranking by district education officers or supervisors described above. We assumed that this ranking would reflect a concept of effectiveness that was broader than academic achievement, and would incorporate general Pakistani assumptions about effective schools, effective teachers, and an effective product of the educational system. The second measure, available at District Education Offices, was the percentage of children passing the district-wide fifth grade and teacher-made fourth grade exams for the two previous years. If they chose to use them, these pass rates were the only objective evidence of academic achievement available to the officials who ranked the effectiveness of schools. The third measure was average class scores on researcher-administered achievement tests. The fourth was a ranking by the researchers on a number of general indicators of teacher performance. The first two measures were used to ensure distinctly different samples of teachers in the initial selection period, while the third was used as an absolute performance measure for teachers. The fourth was an attempt to see how well the judgement of general observers about teacher performance would correlate with other measures of effectiveness. If their rankings were fairly accurate, it might be possible to develop assessment instruments that would cut short the evaluation procedure.

The achievement tests that the researchers administered were developed with funding and assistance from the World Bank for use by the Primary,

Nonformal Wing of the Ministry of Education in Islamabad. They were designed to assess the relative achievement of school children across the four provinces of Pakistan. The tests were developed and refined over a period of five or more years through field-testing in schools throughout the country. At the time of the present study there were just five exams available: fourth grade math and science, and fifth grade math, science, and Urdu. For this reason, the study was confined to teachers' practices in these two grades. In order to report the fourth grade Urdu observations, a proxy score was developed composed of an average of the math and science class average scores combined. The assumption was that since both these subjects are ostensibly taught in Urdu, there might be a relationship between achievement in these scores and Urdu. In the fifth grade, where all three scores were available, the average of the math and science scores predicted whether a teacher would fall into effective or less effective samples for Urdu about two-thirds of the time. Since this proxy score is obviously weaker, the conclusions about Urdu are also weaker.

The math and science tests are highly textbook referenced and, because of the almost universal teacher dependence on textbooks, measure how well teachers transmit textbook content to their students. The Urdu test, on the other hand, was designed to measure understanding and use of the language, independent of specific text content. Since few children in the study speak Urdu at home, one can assume that the test measures the teachers' capacity to build Urdu reading, writing, and comprehension skills in children.

Though unintended, the achievement tests appeared also to measure the extent to which teachers give students responsibility for their own learning. Children who had grown dependent on their teachers for the details of instruction, including correct answers, lacked the self-confidence to take the tests without a great deal of clarification and support. Students whose teachers had given them responsibility for some of their own learning, on the other hand, approached the achievement tests with greater confidence and usually scored better on them.

Before administering the tests, the researchers located the precise page in the text that gave the information needed to answer the questions and then estimated whether the children would have learned that particular material by the time of the visit. Since the classrooms in all areas were observed near the end of the school term and before serious review for exams started, the children had all completed approximately the same amount of text, and therefore it is unlikely that there were major coverage differences.

After class averages were compiled by subject matter and by teacher (for all subjects), the effective and less effective samples were reaggregated to reflect the class achievement scores. The analyses report the samples based on these scores.

Overall the student achievement scores were low—so low in fact that it is difficult in most cases to speak confidently of "effective" teachers. In some cases, the average class scores were below what one would expect if answers were being selected at random. The most usual format for the test questions was to offer multiple choice answers—usually about four different possibilities. Among these four was usually a distractor that might look correct if the child's knowledge was insecure. Thus, a child with some knowledge might do worse than a child who selected answers at random. Sheer randomness was likely to produce a score of around 25 in a large sample of students. Another problem with the test was that, though authorities involved in their development insisted otherwise, children did not appear familiar with the multiple choice formula and therefore may have had difficulties with the mechanics of taking the test. Nevertheless, the test had the advantages of being a generally accepted achievement measure and one that was tied to a considerable extent to the content covered in the classroom. No other tests of comparable nature were available at the time.

Table 2 summarizes the achievement levels and maximum and minimum scores for each type of class observed. Note that the average achievement scores within the urban/rural and male/female samples were approximately the same, even though urban and female-taught classes had higher maximum scores. Within the pairs represented by grades four/five, single/multigrade, and effective/less effective, differences in average class scores and maximum scores were both large. Observations suggest several factors that may be responsible for these differences within pairs:

- Urban schools vary more in quality while rural schools tend more uniformly toward a low-middle standard.
- Female teachers were more likely to use practices identified as effective during this study (overall,

the female-taught classes averaged higher on science and fifth grade Urdu scores, and lower on math scores).

• Grade five classes, because of the major exam that comes at the end of this year, are often intentionally provided with optimal conditions for learning, i.e., single grades and small classes, with more experienced teachers. Students may also be more motivated to have survived to this level.

• Children in single grade classes receive more direct teaching time than children in multigrade classes.

Table 2: Measures of effectiveness

Type of teacher	Average class achievement scores (%)*	Max %	Min %
Total sample	28	49	6
Location			
urban	28	49	7
rural	28	39	6
Grade			
four	23	39	7
five	33	49	6
Grade levels			
single	31	49	7
multi	22	39	6
Subject of instruction			
Urdu	34	85	7
math	21	50	4
science	30	64	7
Gender of teacher			
male	28	39	6
female	29	49	7
Effectiveness of teacher			
more effective	39	49	26
less effective	18	25	6

*Here all except subject scores are based on an average of math and science scores to make it possible to compare fourth grade teachers (where there are no Urdu scores available) with fifth grade teachers (where Urdu scores are available).

Analyses

The analyses were qualitative, including the analyses of statistical information where we looked for patterns in the frequency with which a certain practice appeared in the samples of effective and less effective teachers. Data collected systematically in all classrooms identified a framework of effective practices, while descriptions of classroom teaching helped to elaborate and clarify the patterns found in these data. Checks were made on the validity of findings by comparing them to international research and subjecting them to the intuitive sense of "fit and appropriateness" in the Pakistani context.

Section III: Findings from the Effective Practices Study

Assumptions About Effectiveness

Settling on a definition of effectiveness is one of the major difficulties of research to promote quality in education programs. In this study, as already noted, effectiveness is defined as an average achievement score for the particular group under investigation. This definition contrasts importantly with definitions of effectiveness used elsewhere in Pakistan.[5]

In talking to and observing the behavior of supervisors, district education officers, teachers, headteachers, parents, and students in various parts of Pakistan, it was apparent that other indicators of effectiveness were probably more important than academic performance. Supervisors and teachers appeared to care much more about how a school was organized and how individuals in the school behaved than they did about whether the children developed certain academic skills. As observed from their behavior, they thought the children in the school should be polite, disciplined, orderly, respectful, and aware of social and religious obligations. Academic skills are instrumentally important to obtain jobs and serve national development, but they are less important than character, self-discipline, and respect for authority. Once these assumptions are understood, it becomes clearer why classroom learning is organized as it is in Pakistani classrooms, with an emphasis on processes and procedures that lead to the acquisition of valued social traits, more than on learning the skills ostensibly being taught. It is not unusual—in fact, it is standard—in an education system for implicit socialization objectives to supersede academic objectives in importance, but awareness of these implicit assumptions is important if reforms are to protect the valued outcomes of education.

Educational authorities who ranked the schools in the study invariably approved schools where there was a high level of order and system in the school day...

The national goals for the education system are a good example of Pakistani assumptions about education. There are nine overlapping goals. Seven relate specifically to producing good Pakistani citizens who can contribute to national development through their loyalty and skills; eight mention the importance of becoming a good Muslim; three emphasize skill development but usually in a form which subordinates them to national interests; only one mentions neither Islam nor the State, and enjoins the system to instill the love of learning and discipline in the child. While several of the goals outline the characteristics the child should acquire, such as pride in heritage, good behavior, character, and conduct and motivation suitable to a Muslim, just as often, the child's obligations are outlined—to spread the message of Islam through the world, to contribute to the welfare of fellow Muslims, to participate in national development, and to show loyalty to the State.

Educational authorities who ranked the schools in the study invariably approved schools where there was a high level of order and system in the school day, where children behaved in an orderly manner and were conscientious about learning (usually memorizing) their school work; where children were neat, clean, and polite; and where the school itself had reasonably presentable facilities to impress a visitor. Harsh discipline and unimaginative instruction could be part of this effective package and not detract from it. These officials saw effective teachers as people who provide the environment in which good character traits develop, who keep up with the timetable in the syllabus, who require neatness in work, who keep order in the classroom, and who otherwise ensure that the learning process is a neat and tidy affair. Above all, they are themselves examples of this orderly, disciplined behavior. Teacher evaluation forms, where they exist, tend to focus on neatness, dress, personality, and evidence of being a good Muslim more than they focus on behavior related to

instruction.

These explicit and implicit assumptions about "good" education suggest that to measure effectiveness as Pakistanis conceive it, we should be looking primarily at the extent to which children acquire the desired characteristics of discipline, character, citizenship, and religion, and only secondarily at their academic success. To view the Pakistani classroom emphasis on orderly techniques of rote memorization as sterile learning exercises may be to miss some of the explicit understandings about what constitutes a good lesson in character building and what, therefore, is appropriate education as many Pakistanis see it.

Fortunately, the researcher-administered achievement tests proved more useful than we had expected in representing both definitions of effectiveness. Though education authorities appeared confident in ranking schools and showed a great deal of inter-observer reliability, most had no way of knowing through any objective academic measure whether the teachers in schools they ranked effective were any better than those in schools they ranked less effective. The only potential source for this information—academic pass rates officially recorded for fourth and fifth grade students in district education offices—showed virtually no difference when a comparison was made in the scores of the supervisor-ranked top and bottom schools over the previous three years. Moreover, if these measures had been reported instead as average total scores, or, if the average pass rate had been high enough to discriminate between children and schools, there could have been a measurable difference in schools. With 33 percent set as the passing score, the large majority of students passed and therefore the exams did not prove sensitive to the quality of instruction. This implies that academic test results are not highly valued as a way of measuring the product of the system in Pakistan.

It became important to see how the sample schools stood on the study's independently administered achievement tests. In this case there was a consistent difference between the effective and the less effective schools in all five achievement tests **in the direction predicted by the supervisor rankings**; that is, the average class scores of students in the effective schools were higher in every subject tested than those of students in schools that supervisors ranked less effective.[6] Whatever the supervisors felt made a school effective—even though it could not be verified by existing academic records—was associated with academic achievement in a consistent way in the independently administered tests.

It is difficult to know precisely what factors in the environments that supervisors thought were effective are responsible for higher scores on the independently administered achievement tests. A clue may come from educational research that posits a link between academic achievement and "a safe orderly environment." What Pakistani supervisors see as an orderly school environment may be based on teacher-directed, rote, disciplined approaches. Since the independent tests are designed in the Pakistani Ministry of Education, they are geared toward learning outcomes that result from this kind of teaching.

The fact that supervisor assessments and independently administered achievement tests generally agree makes it reasonable to assume that the test results can be used, not only to measure academic achievement, but also to measure how well instruction meets broader educational goals. By using such measures, the practices that accomplish locally valued outcomes will inevitably appear most effective. Therefore, the definition of effectiveness used here, while limited, may at least identify how teacher performance can help children who are failing to extend their years in school.

As noted earlier, researchers were also asked to rank teachers and class atmosphere in a number of categories that might be used as indicators of teacher performance. If their rankings correlated with effectiveness measures, the reasoning went, these categories might be used on supervisor observation forms. The categories included: teaching ability, knowledge of the subject matter, interesting/enjoyable instruction, clarity of explanations, enthusiasm for teaching, interest in children, ability to help all children, adequacy of guided practice, and feedback, correction, and discipline styles. Though researcher rankings were drawn toward the center of a five point scale, nevertheless there was usually at least a .5 difference between the effective and less effective samples in the expected direction on each of these dimensions. The biggest differences were in factors affecting the relationship between teacher and students: interesting instruction, enthusiasm for teaching, interest in the students, and ability to help all students. Also clarity in explanation was significantly different in the two groups.

When researchers were asked to put themselves in the place of students and evaluate teachers the way the students might, they judged effective teach-

...students of single grade teachers obtain higher achievement scores than students of multigrade teachers whether the teachers are urban or rural, male or female.

ers better in personality and teaching ability, but less positive in discipline style.

Rankings of the classroom atmosphere produced similar results. Effective teachers were ranked better in seriousness of purpose, cleanliness of the classroom, and orderliness of the students. Noise levels were higher in effective classes. More of the effective classes were crowded.

Researchers were asked whether the strategies taught in a theoretical way in the teacher training schools were being used in the classroom. Of the fourteen methods taught during standard training, four were observed enough times to call their use regular: listening/speaking (audio-lingual), question/answer, solving problems posed by teachers, and translation (from one language to another). Others were used infrequently. With two exceptions, larger proportions of the effective sample used each of these 14 methods—supporting findings elsewhere in the body of this paper—that effective teachers are more likely to use greater variety in instruction.

Researchers judged that teacher-directed activities, teacher-student exchange, recitation, and rote memorization were all used about the same amount by both groups.

Though it does not imply that observation proformas could not be made useful, the researchers' rankings were not as useful in the study as hoped. The five point scale presented a limitation that should have been foreseen. An even-numbered scale would have forced researchers to assign teachers to "effective" and "less effective" groups, similar to the groups defined by the scores on the achievement tests. Instead, too many researchers took the neutral central point to make their rankings comparable with those of effectiveness. Only when researchers ranked teachers above or below the middle point was it possible to see that their rankings were reasonably consistent with achievement scores. For example, on one dimension, "teacher ability," the rankings were in the same direction as the achievement measures 88 percent of the time in the half of the sample that judged teachers as better or worse than average.

Characteristics of the Sample

Background information was collected on the schools and classrooms to determine whether there might be important differences in the samples that contributed to the variations in student achievement scores. Though these characteristics are suggestive of factors affecting learning, they should not be taken as definitive because of the purposive rather than representative sampling technique used for the study.

School Characteristics

Overall, the schools in which effective and less effective teachers taught exhibited more similarities than differences. Both samples had about the same physical resources: buildings with about the same number of rooms (3), the same age (20 years), the same condition (half needing major repair or replacement). Effective schools tended to have fewer furnishings, such as desks. On the other hand, they had more amenities, such as toilets, water supply, and electricity, that permit better and more comfortable organization of the school. The effective schools also had larger student bodies and therefore classrooms were more crowded, more students were unsheltered, and more schools had more than one shift. The positive aspect of larger class size is that children are more likely to be taught in single grade classes. According to a BRIDGES survey of approximately 500 schools in 1989, students of single grade teachers obtain significantly higher achievement scores than students of multigrade teachers whether the teachers are urban or rural, male or female. (Paper prepared by Mr. Islamuddin Baloch for the BRIDGES workshop in January, 1990).

Table 3 shows the differences in average class achievement scores between students in the effective and less effective samples studying in single and multigrade classes. It is clear from this table that higher achievement, and thus effective teaching, was more likely to occur in single grade classes.

Table 3: Proportion of samples in single and multigrade classes

Type of sample	Percent of Sample		
	Urdu	Math	Science
Single grade			
effective	80	78	81
less effective	67	61	67
Multigrade			
effective	20	22	19
less effective	33	39	33

When ranking the effectiveness of schools and teachers, supervisors tended to be influenced by the

...learning did not appear to be a function of the quantity or quality of material facilities beyond the basic minimum which all schools in the sample possessed.

quality and quantity of tangible resources, and when asked to give their reasons for ranking the quality of instruction, they often digressed into discussions of material resources. In the end their observations about the differences appeared to be associated more with signs of organization in schools and on school grounds: cleanliness, neatly lined paths, planted areas within boundary walls, etc. Indeed, the attractiveness and quality of physical facilities undoubtedly has a psychological impact on how staff, parents, and students view their schools. Even though officials frequently blame poor teaching on inadequate facilities, that opinion was not supported by the findings of this study: learning did not appear to be a function of the quantity or quality of material facilities beyond the basic minimum which all schools in the sample possessed. The most important aspect of facilities seems to be a designated location called "school" that elicits official support for teacher salaries and has a few basic supplies.

The family backgrounds of students in the two samples were similar with regard to parental occupation and educational background. However, an important difference for this sample may lie in the greater incidence of family backgrounds where Urdu (44 to 32 percent) and Punjabi (82 to 57 percent) are spoken as the first or second language among students in effective as compared with less effective schools. Knowledge of either of these languages would make school work easier for children.[7]

Effective schools had more assigned teachers, a larger student-teacher ratio, and more teachers who spoke the local language. There was, however, no clear or consistent pattern in teacher academic qualifications when these characteristics were combined at the school level to give one category of school in this sample an advantage over the other. Effective schools, however, had fewer untrained teachers on the average (13 to 29 percent).

Headteachers were present in all schools. The supervisors believed, and our subjective impressions were, that more "personable" headteachers were present in effective schools. This suggests that the characteristics of headteachers might be important ingredients of effective schools. In comparison to the less effective schools, effective schools had headteachers who were slightly older (43 to 39 yrs.), had more experience (18 to 16 years of primary teaching and 12 to 7 years as a headteacher), were more likely to come from the local community (56 to 44 percent), were more likely to have a matric degree or higher (100 to 87 percent), were more likely to have had professional training (100 to 81 percent) and were more likely to spend less than full time teaching in order to carry out their headteacher functions (25 to 0 percent). They were also more likely to have been assigned a longer time to the current school (10 to 4 years). Though some of these differences are not great, the fact that headteachers of the effective sample were consistently weighted to the positive side in characteristics that are assumed to improve performance, may have had an incremental effect. In a society where age and tribal/ethnic connections are important, some of these characteristics may contribute to greater respect for a person's authority, as well as to greater accountability within the local community.

Because their roles are not officially defined, headteachers tend to have their own ideas of what their responsibilities entail. In effective schools, headteachers emphasized their instructional and community relations roles, while in less effective schools, headteachers emphasized their administrative roles. In the effective sample, headteachers reported more clearly defined school policies with greater emphasis on educational goals. For example, effective headteachers were more likely to restrict admissions according to a specified set of guidelines, but were more likely to accept dropouts back unconditionally. Attention to such details reflects the more orderly school environment and the greater concern for academic goals that was observed in the effective schools.

Supervisors visited less effective schools more often than effective schools, indicating possibly that their visits were not directly connected with improving teacher performance, or that they gave more attention to schools needing improvement. The comments they left in "supervisor books" and the details asked for in inspection forms reinforce this impression. Effective schools were more likely to have such teacher supports as guides and curricula. However, they were less likely to have teaching kits. Researchers rarely saw any of these kits in use, even when they were available. More of the children in the effective schools had all their required textbooks, but there were not serious deficiencies in this respect in any of the schools.

Effective schools tended to require more exams in addition to the usual half and final year exams, thus perhaps keeping up the motivational interest of both teachers and students throughout the year. The

requirement that teachers keep up with official syllabus timetables encourages them to rush through books, leaving more thorough teaching until the end of the year. Extra exams would tend to slow down the process and require better teaching over the course of the year.

Effective schools were more likely to have morning assemblies before classes begin, to have these activities last longer, and to have the children take a larger part in the performance.

Finally, effective schools consistently reported that they scheduled more instructional time than less effective schools: they had longer days, more time in a period, shorter breaks, and more hours in the school year. Table 4 summarizes the school times reported by school personnel of the two samples.

Table 4: Instructional time in effective and less effective schools

Category	Samples	
	Effective	Less effective
% with shorter day(s) in the week	50	63
Number of classroom periods		
normal day	7.0	5.5
short day	3.2	3.8
Minutes in a period		
normal day	37	36
short day	35	27
Number of minutes in school day		
normal day	259	198
short day	112	103
Minutes in the break	24	30
Hours in the year*	1063	1032

* Estimates were made by subtracting school holidays from the school year and multiplying by the number of hours in the average school day. This estimate is less reliable than the others.

Of the characteristics reviewed here, the ones most likely to have made a difference in the samples are the incidence of single versus multigrade classes, headteacher characteristics, the availability of instructional time, and student language background. The fact that in 75 percent of the schools, the fourth and fifth grade teachers were either both effective or less effective suggests that differences in school characteristics had an impact on effectiveness.

Classroom Resources

Classroom resources, again, were more alike than different in the effective and less effective samples. The same ratio of classes was located in single rooms (77 percent). Effective classrooms had a few more maps, blackboards, chalk, dusters, and teacher texts, while less effective classes had more teacher kits, student texts, and desks. Of the resources available, those in effective classes were in poorer condition, possibly from greater use. Few instructional items were observed in use in any class, however, with the exception of blackboards and textbooks. All effective classes had drinking water available and a third had electricity, compared to less than three-quarters with water and 16 percent with electricity in less effective classrooms. The less effective classes had better natural light, but this was compensated by the greater availability of electricity in effective classrooms.

Before the lesson begins, about the same proportion of teachers in each group "waste" some time in non-instructional activities (42 percent), but less effective teachers waste more time and are away from the classroom a longer part of that time (4 minutes more). Most of the non-instructional time is taken up with administrative duties for both groups.

Teacher Characteristics

In teachers' self-reports, more characteristics and attitudes were alike than different for the two samples. However, there were a few potentially important differences. Effective teachers were twice as likely to come originally from the local area. They had longer academic training and higher grades at the end of that training. They had less professional training, but those who received the training had higher final exam scores. They came from a slightly lower socio-economic level as measured by the combination of father's and mother's occupation and education. Both groups had taught in the same number of schools (3.5), but effective teachers had spent more time in the present school, and more had taught in that school in the previous year. They were absent at approximately the same rates, and both gave transportation problems as the most important reason for absence, and then work-related reasons, such as collecting salaries, etc. Most of both groups were satisfied with being teachers and wanted to remain in the profession. Most in each group, however, were dissatisfied with their salaries, and felt that they needed about 1000 Rs. more per month (or about double their

current basic pay) to provide adequately for their needs. More of the effective teachers were married, but married or not, the majority of each group lived with parents and often siblings.

The effective teachers have a more positive attitude about their students' ability to do school work and, if the students have difficulty or fail exams, believe it is because they have not worked hard enough, rather than because the work is too hard or they lack ability. Of the students these teachers taught last year, more passed and continued on to the next grade, and fewer failed and dropped out or repeated the year than the students of less effective teachers. In both groups, teachers reported few if any behavior problems, but less effective teachers used more varieties of punishment to keep their students under control. Effective teachers were more likely to use the textbook exclusively. More have seen curriculum objectives and have teacher guides in their classrooms. They use a greater variety of techniques/tasks in Urdu and fewer in math. Effective teachers are more likely to use tests and to use them more often; the purpose, they say, is to check students' comprehension and to keep them working hard. Both groups assign about the same amount of homework (4 days in each subject) and it takes about the same amount of time per day (30 minutes per subject). Effective teachers are more likely to require correction of homework mistakes. Both groups are unlikely to send reports home to parents. The majority of both samples use student monitors to keep order when they want to do something else, and also use peer teaching where smarter students are called upon to teach slower students.

Headteachers are more active in visiting the classes of effective teachers and in giving advice, but effective teachers report that they are less likely to seek advice from these officials than less effective teachers. Effective teachers are more likely to prepare for class and to ask children to review previous work. They are more likely to feel that the textbooks are easy for children in all subjects except Islamiyat. Both groups feel facilities, instructional materials, textbooks, and writing materials are sufficient for their classes.

The self-reported teacher characteristics which, alone or as proxies, may have contributed to the greater effectiveness of one sample over the other are local origin (identification with and knowledge of the language of the students), longer academic training, higher scores on academic and professional exams (as evidence of superior ability), greater use of tests and review, and a generally more positive view of the students and the learning materials.

Effective Teaching Practices

Effective practices, as noted already, are defined pragmatically in this study as those used by a sample of teachers whose students perform better on achievement tests. (It was noted earlier that these teachers are probably accomplishing more of the valued social objectives of education also, since their approval rating by supervisors is higher). Though achievement scores as a whole were low, nevertheless, students of effective teachers scored approximately twice as high on every subject as students of less effective teachers. If it were possible to double the scores of students in the classes of less effective teachers by replicating effective practices, the gain would be significant. Students of effective teachers also showed lower annual[8] dropout (by 2.3 percentage points) and repetition rates (by 1.4 percentage points)[9]; and if these improvements could also be duplicated, wastage would be significantly reduced.

An assumption behind the study is that teachers who produce higher achievement in their students are expert practitioners who, intuitively or otherwise, have worked out ways to get more out of their students and out of the resource context in which they work. It is the comprehensive package of their instructional practices, therefore, that is important as a model. The practices that need to be reported are of two kinds: those used prevalently by a majority of effective teachers (and sometimes also by less effective teachers), and those that discriminate between the samples of effective and less effective teachers. The latter may give the added edge that makes the difference between the two samples, but it is possible that they would not work effectively if unaccompanied by the other set of practices.

Practices are reported automatically, therefore, if more than 50 percent of the effective sample uses the practice. Where a practice distinguishes between effective and less effective samples by a greater incidence of 10 percent or more in the effective sample, it is also noted. Though 10 percent is selected arbitrarily, it seems a large enough difference, at the level of detail of the behaviors observed, to be included in the set of potentially effective practices. No effort has been made to try to isolate "most effective" practices, since it is unlikely that one or two practices would have the same impact taken alone as when

combined with other practices, each contributing its part to effective teaching/learning. Effectiveness appears to be the result of a number of practices combining in a synergistic way.

A warning should be given about effective practices, however. Specific behaviors that seem intuitively right for the conditions in Pakistani schools, yet appear infrequently or not at all, might still prove to be effective practices if they were used more often or if they were modified in a way that made them more appropriate to the learning process. For example, the use of peer teaching, which appears an ideal technique for the multigrade conditions common in Pakistani schools, is not a practice associated with the effective sample. The reason may lie in the way "peer teaching" is frequently conducted, as a "cheerleading" effort where one student shouts out a phrase and the rest of the class repeats in unison.

One may legitimately ask how effective teachers learn to use effective behaviors since few, if any, of the behaviors presented here are explicitly taught in training courses. The most realistic answer is that good teachers have an intuitive feel for what works and what leads to desirable educational outcomes. They may use what was attractive during their own schooling. Because they cope with similar conditions and come from similar backgrounds, the likelihood is greater that what they have discovered can be taught to other primary teachers in Pakistan.

General Findings

A number of general findings emerged from the study. These are as follows.

Effective teachers use *systematic logical sequences* in teaching. Much of learning naturally builds in steps, one leading to another. A generic sequence that appeared effective for daily lessons included:

- preparing a base through review,
- focusing student attention with preliminary statements,
- presenting new materials in appropriate ways,
- supervising initial practice closely,
- allowing enough time for children to practice independently, and
- adding practice through homework.[10]

Effective teachers were not only more likely to use such logical sequences, but were also likely to use a more complete set of these particular behaviors than less effective teachers. A synthesis of research on explicit teaching endorses very similar sequences, for "teaching any well-structured discipline where the objective is to teach performance skills or mastery of a body of knowledge" (Rosenshine, 1986:60).

Effective practices are *synergistic*, that is, they comprise a combination of behaviors that is more than the sum of its parts. Isolated practices, no matter how effective in themselves, are not as effective as introducing as many of the key elements as possible.

Variety appears to be a key ingredient in effective teaching. It is better to approach the activity of learning from a number of directions. A single practice or task contributes to learning up to a point in a lesson, after which it loses its potency, and teachers should reinforce learning in other ways. Often, for example, seemingly sterile activities such as copying from the blackboard, or repeating paragraphs from the text, or rewriting something more neatly helps the learning process. Alone, these practices may have little impact on learning, but in conjunction with other practices that engage the child's mind, they may prove exceedingly useful in reinforcing learning.

Effective teaching is a *contextual* phenomenon. Effective practices in Urdu may not work for science or math; what is effective in a multigrade class may not be in a single grade class; what is effective for a fourth grade class may not be for a fifth grade class that is preparing for a major exam; what is comfortable for one kind of teacher may not be for another. Effective teachers adapt "logical learning sequences" and other instructional practices to the circumstances of the class and the subject matter they are teaching.

Effective teachers seem to be aware of the *learning implications* of instructional practices. All practices which are repeated again and again in the classroom have implications for who learns, what is learned, and how much is learned. For example, how children are called on in guided practice has learning implications. To call on volunteers exclusively is usually to call on those who already know the answer; to single out nonvolunteers may slow down the lesson; moving around the class in specified order gives full student coverage but allows children's attention to wander until their turn comes; random order maintains attention but requires the teacher to remember who has not been called on. Choosing the brightest, slowest, closest to the front, closest to the aisle, or any other group, selects those who will receive the most chance to practice with teacher supervision. Each method also has implications for whether or not children maintain a high level of engagement in the learning task. Effective teachers

chose practices that have higher learning payoffs in their own situations.

The way the teacher *manages instructional time* is also an important element in effectiveness. This subject is treated in a separate section below.

Effective teaching is built on successful *teacher-student interactions.* The quality and kind of interaction model behaviors expected by the society for interpersonal relationships in general, and therefore are important in establishing how an educated person should behave. Some of the practices involving teacher-student interaction that were effective were the following:

- *Teacher-directed learning activities.* Effective teachers usually directed most of the classroom activities, although, at the same time, they were more receptive to student-initiated questioning under controlled conditions. In Pakistani classrooms, teachers expect to receive respect, and students are expected to show a number of ritual politenesses to support that position. Teacher control and visible politeness rituals were signs to the researchers of a well-organized classroom. It would be difficult to introduce teaching reforms on a broad scale in Pakistan, if they are not patterned on the assumption of teacher control and position in the classroom. Indeed, teachers who lacked this kind of control in the sample classrooms usually exhibited other behaviors, which, in the context of Fakistani schools, are clearly less effective, such as ignoring students in independent practice, or not providing reinforcing feedback in practice sessions.
- *Discipline.* Effective teachers maintained discipline by instituting a set of rules that are well-understood by students and are obeyed automatically. Less effective teachers were more likely to intervene during the lesson to keep order. They also used a greater variety of punishment, both verbal and physical. Effective teachers were consistently gentler and more considerate of their students than less effective teachers.
- *Language.* Effective teachers used the national language, Urdu, most of the time in instruction, thereby giving their students valuable practice.[11] The one subject exception was math where they augmented Urdu with explanations in a second, better-understood language, suggesting their sensitivity to the demands of the subject and to student comprehension. Observers felt that students of effective teachers were better able to comprehend the language of instruction and spoke with a better accent.
- *Feedback in practice.* Feedback appears to be one of the most important kinds of student-teacher interaction. Effective feedback allows as many children as possible to know how they are doing, uses correct answers as a way to reinforce learning, and gives children who make mistakes a chance to respond correctly. Feeling successful is a well-documented reinforcement for learning.
- *Monitoring.* Monitoring classroom practice during independent seatwork appears to work better when the teacher takes an active role in checking student progress and gives students special help.

Learning Sequences Used by Effective Teachers

The generic learning sequence used more frequently in part or in whole by effective teachers is described below to show how effective practices are incorporated into a lesson. Table 5 shows the incidence of each of these practices in the samples of effective and less effective teachers.

Table 5: Use of instructional practices in effective and less effective teaching

Type of behavior and subject	Percent of sample using behavior	
	Effective	Less effective
Review		
Urdu	44	35
math	53	31
science	79	48
Preliminaries		
Urdu	90	92
math	81	76
science	96	78
Presentation		
Urdu	83	69
math	77	69
science	100	81
Guided practice		
Urdu	79	69
math	96	79
science	75	48
Independent practice		
Urdu	81	60
math	77	48
science	71	48
Homework		
Urdu	27	32
math	35	19
science	33	19

Review: Effective teachers conducted review periods in all three subjects more often than less effective teachers. The most effective review was a short practice of the previous day's work at the beginning of the lesson.

Preliminaries: It is useful to begin the lesson with a few preliminary statements to focus children's attention on the subject. Effective teachers used preliminaries somewhat more than less effective teachers, especially when teaching science. It is not clear exactly which type of preliminary statement is the most effective, however: asking students to turn to a text, giving the lesson topic, or explaining objectives briefly. The last, "stating objectives," is used less frequently by teachers as a whole, except in science where it appears to be an important practice. [1] Perhaps if the objectives were stated in Urdu and math, this would clarify and focus the lesson. Another point of view was expressed by teacher trainers who had strong reservations about teachers telling students the objectives of the lesson, since "objectives are something to guide a teacher and are not something students need to know."[12]

Presentation: Effective teachers were more likely to give a formal presentation of new material rather than simply starting practice without any explanations. The nature of the subject matter dictated which type of presentation was most effective: small steps with practice after each step, a formal lecture, or immediate practice with accompanying explanation. The subject matter also determined which types of illustrative material were most useful: definitions, examples, explanations of concepts, etc. Effective teachers were more likely to use the blackboard during this period. They were also more likely to present materials in a clear way, using language that students understood. It was important to pace the instruction so the lesson was interesting, while making sure that even the slowest students could keep up.

Guided practice: Guided practice is the period when teachers closely supervise students' initial efforts with the new material. Teachers generally work with the class as a whole, giving active practice by posing questions and giving quick feedback on how well the students are doing. Effective teachers were more likely to conduct a period of guided practice and more likely to give feedback after each task or after a few tasks. Almost all tasks in guided practice came from the textbooks. The subject matter dictated the kind of task—explanations, summaries, meanings, writing practice, etc.—and how much it should be used. Teachers usually gave one to six tasks for each new piece of information during a guided practice, but these assignments varied according to subject matter.

There was no clear evidence about what worked best when calling on students during practice, though there are obvious implications to each pattern: brightest, slowest, volunteers, non-volunteers, random, a specified order, or a mix. It was clearly better, however, when most of the children had a chance at practice and were given individual feedback. This suggests that it is better to use a system that eventually elicits a response from each student. Again the type of response expected—specific answer, repetition, application, etc.—depends on the subject matter. At the end of the practice, most teachers asked if children had understood the lesson. There are also other signs of comprehension that a teacher might look for, and which observers found more commonly in the classes of effective teachers: by the end of the lesson, most children answer correctly, many raise their hands to answer, and most respond without hesitating.

The kind of feedback teachers give appears to be important. When children answer correctly, it is generally better if the teacher responds in some way to acknowledge the correct answer. It is also useful to reinforce learning by repeating the answer or, better, by explaining or having the child explain how he or she came to the correct answer. Brief praise is better than no response at all (more often found among less effective teachers). If the answer is incorrect it is better for the teacher to continue a discussion with the child until he or she is able to answer correctly, through explanations, hints, or simplifications of the questions. Not so effective is to move on to another child for the answer, leaving the child who has answered incorrectly with a sense of failure.

Independent practice: Independent practice is that part of the lesson when students work with less supervision from the teacher than during guided practice. The purpose of independent practice is for the children to gain confidence by working on their own. The effective teacher, however, may use this time to give more individual help to students who are still having difficulty.

Effective teachers were consistently more likely to conduct a period of independent practice as part of the lesson. Usually they assigned seatwork, but some teachers also asked children to work in small groups,

especially when the class was multigrade.[13] As in guided practice, most of the tasks came from the textbook. It appears that achievement is greater when this is the case, or when the tasks include reworking from guided practice. Effective teachers are not as likely to create their own problems.[14] The extent to which specific tasks are effective is generally tied to the subject matter.

Effective teachers were more likely to monitor independent practice by direct, individual attention to students: the teacher walking around the room and stopping by individual students' desks, asking children to raise their hands for help, and having children come to them for help. Less effective teachers were more likely to look upon independent practice as a rest break and simply ignore the students. Effective teachers alternated between giving individual and group feedback and were more likely to give feedback to all the students during guided practice.

Homework: Researchers only infrequently observed homework activities in the sample classrooms. It is possible teachers did not engage in homework activities because of the observers' presence. It is also possible that students understood assignments so well they could follow the routine automatically. All teachers of both samples claimed that they gave homework. (Each group averaged assignments about 4 days a week in each of the three subject matters, with the effective sample giving homework slightly more often.) Even though they constituted a small group, effective teachers were observed giving homework more often in math and science than less effective teachers. The results of international research on the advantages of time spent on instructional tasks suggests that if Pakistani teachers are not already doing so, they should assign homework regularly.

Overall, Pakistani teachers use a fairly standard range of instructional behaviors. Within this range, however, effective teachers use a greater number and variety of behaviors in any single lesson. In addition, they tend to implement these practices in a more systematic and logical way, with the appearance of understanding the instructional implications of learning sequences and combinations of behaviors.

Subject Matter and Effectiveness

Teachers who could teach one subject well were not always effective in teaching all subjects. Of the teachers who had three student achievement scores (in math, Urdu, and science), about half were consistently effective (24 percent) or less effective (20 percent) in all subjects. Another 40 percent were effective in two out of three subjects, with the weak subject more likely to be Urdu, followed by math and finally science. Those who were effective in only one subject were more likely to have been strong in Urdu and weak in math and science. It is more likely to find a link in the capacities for teaching math and science, and secondarily, for Urdu and science. Only rarely did a teacher teach math and Urdu well, but not science.

In some details (see also the section on "Instructional Time" below), effective practices differ depending upon the subject matter. Effective and less effective teachers also are different in the extent to which their sets of practices converge in teaching various subjects. For example, teachers of both samples were much more likely to use similar practices in teaching math; i.e., fewer practices in math were found with sufficient variation in frequency to distinguish between the two samples. On the other hand, effective teachers used considerably different and more varied practices than less effective teachers when they taught science. Many less effective teachers seemed to be at a loss when teaching science. They could not use the repetitious recitation methods of Urdu, nor were there problems to solve as in math. One teacher explained that his method was to write definitions of scientific concepts on the board, along with model answers to questions at the end of the unit in the textbook; children spend the science class copying these notes and memorizing them.

What is the source of this variation in science? It is possible that even such unimaginative teaching as the above example requires more teacher involvement in designing the lesson than the other two subjects do. It is also possible that some teachers have had less schooling in science and therefore have fewer models to follow from direct experience than they do in Urdu and math.

Below is a brief summary of practices in each subject that distinguish effective teachers from less effective teachers. These may be the practices which, in addition to standard practices, give their students the added edge.

Urdu: In Urdu, effective teachers started with a brief review, consisting of work from earlier lessons in the text. They were more likely to use the blackboard to write down important points, such as definitions of words and concepts. In general, effective teachers paced Urdu lessons to the slowest student,

but kept the class moving so it did not appear boring. They were more likely to call on students randomly to keep an element of surprise. During guided practice, effective teachers were more likely to ask questions that showed whether children understood basic facts and concepts from the lesson content. Less effective in both guided and independent practice were tasks that required repetition/choral responses imitating a leader. The effective teachers closely directed the class activities but allowed time for student questions. When giving feedback, effective teachers were more likely to use correct answers to reteach or elaborate a concept. In response to an incorrect answer, they often modelled the correct answer by giving a meaning, correct grammar, or more accurate pronunciation. They were also more likely to explain and give the child a chance to answer again. In independent practice, they were more likely to ask children to copy meanings and explanations from the textbook or from guided practice. For homework, they were more likely to ask questions about the lesson, usually from exercises in the book, and to have students practice calligraphy.

At the end of the study, researchers described how an effective teacher would teach an Urdu class:

> "The teacher first briefly describes the lesson topic and makes links between the topic and previous material which has been learned or other similar information relevant to the children's lives. The teacher might then read the lesson through, explaining the grammar and the meaning of difficult words and writing them on the blackboard. Then he or she asks each child to read a paragraph of the lesson individually, making sure that the child pronounces the words correctly. After each child has practiced reading, the teacher asks the children to copy in their Urdu notebooks the difficult words from the blackboard. Then the teacher asks questions until he or she is sure all the children understand the new material. After this, he or she asks the children to copy paragraphs from the lesson at their seats as a way of practicing writing. Finally, the teacher asks the children to make sentences with the new or difficult words for homework. The next day the teacher follows up by correcting the homework and giving a dictation test of passages from the text to see if the children have learned the lesson. The effective teacher teaches at a level appropriate for the students' comprehension and at a pace that is not too fast nor too slow to keep them interested. In an Urdu class, the emphasis should be on giving children practice in the language, including pronunciation, writing, speaking, and comprehending. To give more practice, the teacher may use such devices as splitting the class into groups and letting them correct each other's mistakes."

Math: Effective teachers were more likely to begin the lesson with a short period of review from the previous day's lesson in math, followed by a period of presenting new material. Not surprisingly, lecturing was not a suitable way to present new materials in math. Effective teachers were more likely to demonstrate how to solve problems on a blackboard. In math they were more likely to supplement their explanations in Urdu with local languages. Less effective was beginning directly with practice, without an explanation of how to solve the problems. Though the lesson should be oriented to the slow student, it was less effective if paced so slowly that it became boring. The effective teachers used tasks that showed whether the children were understanding how to solve problems and could apply what they had learned to new problems. Complicated abstract explanations were less effective than actually solving problems. Effective teachers gave feedback to incorrect answers with hints, simplifications, and explanations until the child gave the correct answer. In independent work, it was best to give additional problems to the child to solve at his or her seat. Feedback was more often given when the whole group was listening. Children indicated when they needed help or went to the teacher at his/her desk. Effective teachers gave more homework and were more likely to ask children to correct their homework in class.

The researchers described how an effective teacher would teach a math class:

> "The effective math teacher starts with a brief statement of what the students will learn that day and says a few words about the topic. If necessary the teacher reviews other material that relates to this lesson. Then he or she explains the material thoroughly, first in simple steps and later in a more complicated way, if that seems appropriate, by giving examples on the blackboard of how problems of varying difficulty might be solved. The effective teacher gives explanations in clear simple language. When the teacher thinks the students understand the basic principles behind the problems, he or she tests the students by asking as many of them as time

allows to come to the blackboard to solve problems. The teacher will be concerned that even the slowest student learns the concept. Whenever students answer questions, effective teachers indicate how well they are doing, and help them if they have difficulty solving the problems. Then they give the students problems from the text to do as independent practice. At the end of the class, the students are assigned exercises from the text to do at home. The effective teacher follows up on the homework the next day and makes sure the students correct their mistakes. He or she also supplements the work in the book with extra problems so the child will not simply memorize pages from the book."

Science: Effective teachers were more likely to start the science period by stating the subject of the lesson. Next they briefly reviewed the previous lesson. In presentation they used the blackboard to write definitions, examples, or explanations of the concepts in the lesson. The presentation was best geared so even the slowest students could follow, and it was less effective when geared to the smartest. It was also less effective to begin immediately with practice.

Effective teachers used considerably more variety than less effective teachers in the tasks for guided and independent practice in science. In guided practice effective teachers used explanation, understanding, recalling basic facts, correcting mistakes, student demonstrations on the blackboard, summaries, meanings, and practice writing. Less effective were choral repetition, reading, and simple copying from the text. Effective teachers asked more often for oral individual responses, and for comments on answers from others in the class to complete or elaborate on them. Effective teachers provided feedback after each task and they were more likely to call on those who volunteered answers. In response to correct answers, they praised the student, repeated the correct answer, or used the answer to reinforce a point from the lesson. With incorrect answers, they simplified or explained the question and then asked the child to try again. Less effective was moving on to the next child without helping the child who had given the incorrect answer.

In independent practice, effective teachers were more likely to ask children to carry out tasks where they copied meanings, labeled items such as plants, or gave examples from guided practice or the text. Less effective was practicing writing general passages from the text, reciting the text out loud, reading the text alone, or memorizing the text. Effective teachers asked children to come to the teacher when finished, or walked around giving feedback to the individual student. Though the majority of all teachers directed class activities with students responding when asked, effective teachers gave students more freedom to initiate questions, and some even allowed a much freer exchange than was acceptable in other subject matters. Effective teachers were also more likely to give homework, asking children to write answers and give explanations about the lesson topics, and to memorize prose or basic facts from their texts.

Instructional Time

International research has shown the importance of time as an educational resource. According to this research, learning is affected by how much time is made available during the school year, the school day, and the various stages of education; how much time is needed to learn a specific set of objectives; and how productively the available time is used. A number of factors affect both the quantity and the quality of time spent in learning, including the number of students in class, the effectiveness of teachers, the amount of time in the school day actually spent on instruction, and the attendance levels of teachers and students. Each of these factors can be affected by policy changes.

In Pakistan, there are major difficulties in studying the amount of time teachers spend in various instructional activities. During unexpected visits to schools, it is more the rule than the exception to find teachers not actively teaching in their classrooms. When researchers are present in the classroom, teachers are likely to spend a great deal more time teaching than they might on a normal day. To offset this problem in the study, classroom activities were clustered into the major categories already noted and the actual time spent in each was timed. These actual times were converted into proportions of the total time used for the subject lesson and the main analyses were based on these **proportions** of time. The assumption was that, though actual minutes of teaching may increase when researchers are present, the relative differences between proportions of time spent in various activities may remain approximately the same.

Availability of time: Policymakers may set official times for the school year and day, but the impor-

...even though effective male teachers spend more time on average in presentation than female teachers, they spend less time on this part of the lesson than less effective male teachers...

tant questions are whether and how these times are used in schools. In the sample schools there was a great deal of variation, not only in the amount of time school staff reported was available, but also in the actual time used for instruction as observed by the researchers.

A number of factors affect the amount of time available for instruction. Among the most important observed in the schools were the following:

- the number of official school hours set by authorities
- teachers' access to school in terms of distance from their residence and availability and cost of transport
- teachers' outside commitments: other employment, household, and other responsibilities
- teachers' motivation to actually teach what they are supposed to teach
- the absence rates of teachers and students
- the level of officially tolerated teacher absences
- crowded classrooms and multigrade teaching that reduce teacher time for individual students
- sub-standard facilities that prevent the holding of classes in inclement weather or require long breaks because there are no toilet facilities
- the ways teachers use time in the classroom

In every way instructional time was measured–by length of days in the week, by hours in the school day, by lesson length, by minutes in the break, by number of school days in a year, etc.–officials in schools where student achievement was higher reported more time available for instruction than those where student achievement was lower. Overall, effective schools totalled about a third more time in the normal school day available for instruction.

Use of time: Table 6 shows the amount of actual time researchers observed teachers using for instructional and non-instructional activities. As a whole, the number of actual minutes of lesson time and the extent to which more time is used for instructional purposes varies in the same direction as the achievement ratings within categories of teacher. Thus, grade five, single grade, and female teachers waste less time in noninstructional activities and spend more time in total minutes devoted to instruction than do relevant comparison groups. They also have higher maximum or average achievement scores.

The breakdown of instructional time by subject lesson also illustrates what was obvious during the observations, namely, that teachers spend more time on some subjects than others. This fact may be related to the ease teachers feel with a particular subject or it may be related to the nature of the subject matter itself. For example, there is a limited set of activities commonly used in teaching Urdu that becomes exhausted after a certain period. Extending this period with more individual student repetitions of the same lesson text becomes boring for both teachers and pupils. Most teachers feel they have finished the Urdu lesson when individual students have completed a certain number of repetitions of the material. Math, by contrast, can be extended almost indefinitely by supplying more problems to solve. Since more students are actively involved in the exercises, teachers can keep them interested in the work longer. Many teachers do not feel comfortable with the concepts of science and therefore find it difficult to elaborate on the lesson beyond lecturing from the text and questioning students about lesson concepts. Therefore teachers usually complete science lessons in a much shorter time than either Urdu or math, and may conduct these classes only once or twice a week compared to the daily lessons in the other two subjects.

When time is examined from the perspective of instructional clusters such as review, preliminaries, presentation, etc., approximately 80 percent or more

Table 6: Lesson time spent on instructional and non-instructional activities

Type of classroom	Instruction total (min.)	Non-instruction total (min.)
Total sample	41.0	2.3
Location		
urban	41.9	1.5
rural	39.9	3.4
Grade		
four	40.2	2.4
five	41.7	2.2
Grade levels		
single	42.8	1.6
multi	36.6	4.1
Subject of instruction		
Urdu	41.4	3.0
math	46.9	2.3
science	28.5	.8
Gender of teacher		
male	39.4	3.4
female	42.6	1.2

time in every sample category is spent in the three major clusters: presentation, guided practice, and independent practice. Overall, in the total sample with subject lessons combined, after giving a comparatively shorter period of formal presentation of the new materials, teachers divide their time about equally between the two kinds of practice, guided and independent. The remaining 20 percent of the lesson is spent in descending magnitude on review, preliminaries, other instructional activities, and homework.

Subject matter and time: Effective teachers allotted time differently depending upon which subject they were teaching. Table 7 shows, pictorially by subject matter, how effective teachers distributed the proportions of time they spent in the three most time consuming activities of the lesson: presentation, guided practice, and independent practice.

Table 7: Effective patterns of instructional time by subject

Category	URDU	MATH	SCIENCE
Presentation	++	++	++++
Guided practice	+++	++++	+++
Independent practice	++++	++++	++

++= 10%-19% +++= 20%-29% ++++= 30%-39% of total instructional time.

The patterns used by effective teachers for each subject matter are:

- Urdu: the proportion of lesson time devoted to major instructional activities increases from presentation through guided practice to independent practice.
- Math: a short presentation is followed by about equal time in guided and independent practice.
- Science: a long presentation is followed by a shorter guided practice and an even shorter period of independent practice.

The way effective teachers use time makes intuitive sense given the nature of the different subject matters and the way they are generally taught in Pakistan. In Urdu, for example, a short presentation is all that is necessary for teachers to read completely through the text once (for comprehension and to explain new words), before students begin the mechanics of decoding the text themselves. What is more important in Urdu is a period of practice, with teacher supervision until the child can work the new material reasonably well, and then independently for a longer period until the child becomes confidently proficient in the material. A great deal of the student's success in Urdu, as it is taught in Pakistan, involves memorizing the content, meanings, and new words of lessons. These accomplishments require periods of concentrated independent practice.

In math, guided and independent practice are more important than listening to a lecture about the new material. After briefly presenting new ways of working problems, teachers can use time more effectively by providing sufficient guided and independent practice for students.

Science, as taught in Pakistani schools, requires mastering textbook concepts. These concepts are first presented and explained by the teacher. Then students demonstrate their understanding of the concepts under the close supervision of a teacher in guided practice; and, finally, as a review, the child may briefly reread the material. The lack of resources in science classes and the present expectations about how science should be taught, de-emphasize the hands-on types of practice that children might otherwise engage in during independent practice.

Other factors and time: When the samples of teachers are disaggregated into groups based on specified characteristics, it becomes apparent that individual groups manipulate time to suit the conditions they find important. As long as they keep within certain limits (they do not reduce time spent on any of the major activities or disturb the proportional relationships that seem to work well for the different subject matters too drastically), they can manipulate the use of time and still remain effective.

For example, effective fifth grade teachers spend more time on practice than fourth grade teachers, probably because of impending major exams. Effective multigrade teachers use more time than single grade teachers in activities that require less teacher attention, such as independent practice. Effective single grade teachers have the luxury of conforming the most closely of all groups to the time patterns used by effective teachers generally.

Female teachers spend less time in "presentational" and more time in "interactive" activities than male teachers, probably because sex role expecta-

tions in Pakistani society call for women to be more nurturant, informal, interactive, and responsive and men to be more assertive, formal, and presentational. Still, even though effective male teachers spend more time on average in presentation than female teachers, they spend less time on this part of the lesson than less effective male teachers—in other words, in comparison to their less effective colleagues, they conform more closely to the time-use patterns of effective teachers in general. Effective female teachers, following their inclination to be more interactive, spend less time on formal presentation and more time on independent practice (where they can work one on one with students) than do less effective female teachers.

The patterns exhibited in the present sample show how time can be manipulated to add an important dimension to instruction. In identifying an effective time-use pattern for each subject, however, it should be remembered that this pattern is an average of aggregated patterns used by effective teachers, each of whom has special conditions to consider. The extent to which a teacher successfully balances the requirements of context against the requirements of subject matter, keeping within the tolerance range of what is effective for the latter, is the extent to which he or she is able to manipulate time to contribute most successfully to learning.

In summary, the effective use of time in the present sample depends upon a number of factors. Among them are how much time is available, how much available time is used in instructional activities, how time is distributed over different major learning activities, what is required for the subject being taught, what the teaching conditions are, and what gender the teacher is.

Section IV: Conclusions and Recommendations

Conclusions

In the absence of clear consensus about what quality is, national programs can begin with the narrower, but still important, "quality" goal of reducing student wastage. With this approach, improvement is an incremental, continuous process that begins by making existing systems more efficient, and develops into programs that better meet the needs of the nation as these become defined. At present, the key to reducing wastage appears to be improving teacher performance. It is assumed that improving achievement will keep more children in school and progressing through the grades at expected rates. It is assumed also that the longer children remain in the system, the more skills they will learn.

The objective of this study, therefore, has been to identify a set of effective teaching practices to serve as the core for an improvement program. The definition of effectiveness taken for the study was a specifically Pakistani one, in that the measures used to determine relative effectiveness were achievement tests developed in the Ministry of Education. These test scores corresponded closely with supervisors' evaluations of effective instruction.

Effective instruction, in this sample, turned out to be the happy mix of practice and context. The most effective teacher adjusts instruction to the subject matter, to the audience, to the learning environment, and to the implicit and explicit expectations of the system.

Listed below are some general features of effective teaching practices that emerge from the study. Effective teachers:

- use systematic logical learning sequences (an example is given above);
- use a combination of practices that are synergistic in their effects;
- use variety in their instructional approaches to reinforce learning from many different angles;
- draw from their repertory of instructional practices those that fit the immediate conditions and the subjects being taught;
- seem to understand the learning implications of the practices they use;
- use more of the time available in direct instruction and organize time to suit the subjects being taught.

Specific practices, also, facilitated learning in the sample classes. They include:

- a disciplinary system based on teacher-instituted rules that students automatically obey so little overt teacher control is required;
- teacher-directed activities that allow for student participation and some questioning; this format is most compatible with the participants' concept of the orderly way in which teaching/learning should take place;
- major use of Urdu, the language of instruction, but supplemented with explanations in a known language for technical subjects such as math;
- feedback for as many individual students as possible, with emphasis on the teaching opportunities for providing feedback for both correct and incorrect answer, feedback that makes students feel they can be successful in the new skills;
- monitoring activities in which teachers actively supervise the work of all students and give additional help to individual students who need it.

Effective teaching methods suitable for a national context can be identified by small systematic studies of teaching practices...

Recommendations

Effective practices can improve instruction in the primary school program of Pakistan. It is possible to introduce effective practices to teachers in short preservice or inservice methods courses with the expectation that they will carry over into the classroom. Since the effective practices reflect "the best thinking" of good Pakistani teachers, they are likely

to be easier to implement than models that do not originate in the indigenous context. However, there is little reason to believe, with the conditions existing at present in Pakistani schools, that "poor" teachers will feel motivated to carry on a more inspired teaching than they do now. It is more likely that improvements in classroom learning will occur if the introduction of effective practices is accompanied by other changes that support their use in the classroom.[15]

The following recommendations offer suggestions on how effective practices might be implemented to obtain the greatest impact on classroom learning. Though drawing strongly on the conditions of schooling in Pakistan, the recommendations are presented in a general form for potential application to other countries with similar conditions.

In addition to a core of effective teaching practices, the recommendations suggest the components necessary to support effective teaching. An effective learning program includes the following components.

Policy Dialogue

Education authorities need a well-formulated and clear statement of the objectives of the education system, elaborated in enough detail that their implications can be carried out in the classroom. Without this clarity, good teachers can only ensure that children perform well on existing tests of the system.

Assessment

Assessment practices need to be thoroughly reviewed to see if they meet the needs of the program. Tests drive the system, and help determine what children learn and teachers teach. Effective assessment 1) allows teachers and planners to know if children are learning what they are supposed to learn, 2) permits resources to be allocated where needed to strengthen programs, and 3) motivates teachers to improve student learning.

Learning Materials

Improving the quality of learning materials, such as textbooks, is an important ingredient in improving instruction.[16] In Pakistan, instructional materials need to be 1) less teacher-dependent, 2) bear some of the burden for teaching skills that are lacking, and 3) well-sequenced, simple, and appropriate to children's ages.

Teacher Incentives

Teachers need incentives, such as status, professional or merit recognition, for bringing their students to a high level of learning. When there are no obvious consequences of their actions, few teachers feel motivated to perform well. Diagnostic tests in annotated texts are a first step, but teachers and students also need recognition from sources outside their schools.

Effective Practices Studies

Effective teaching methods suitable for a national context can be identified by small systematic studies of teaching practices in classrooms, as has been demonstrated here for Pakistan. The findings of these studies help to provide specific content matter for short methods' courses such as the one described below. For example, effective teaching sequences, such as those identified through the study, indicate a general framework for organizing classroom teaching, while findings about specific practices indicate suitable variations for a range of contexts and subjects.

Teacher Training

Teacher training in many countries has had little impact on student learning. The fact, however, that samples of teachers using an identifiable set of methods have higher student achievement than teachers not using these methods, as the present study has found, suggests that training could be effective if the successful methods were taught to other teachers. The problem in many current programs is that the abstract nature of training has little to do with actual classroom conditions.

Before making comprehensive, and possibly expensive and ineffectual, changes in training programs, policymakers can begin to improve programs by developing *short, practical methods courses* for teaching practices that have proven effective in their own or similar countries. These courses can be either preservice or inservice and should be accompanied by easily used *support materials,* such as annotated lesson plans, that reinforce and maintain effective teaching practices in the classroom. The courses should be attended by *teachers, supervisors, and managers* of teachers so they will learn how to provide support for the changes in the classroom. Means need to be developed to *assess the impact* of the training on student learning. The course should not be disseminated broadly until it has been shown to improve teacher performance and, consequently, student learning.

In these short, practical, hands-on methods courses, teachers should learn the following (see more detailed examples in the effective practices findings above):

- to carry out effective learning sequences through practicing them with each other and with students in actual classrooms,
- to command a broad repertory of teaching practices and understand their implications for learning in various contexts and subject matters,
- to use annotated guides that support the use of effective teaching practices,
- to adjust instruction to the subject matter, the audience, the learning environment, and the implicit and explicit expectations of that particular system.

Teacher Support Materials

Support materials, such as teacher guides, simple charts, and practice materials, can make teaching easier. Before resources are put into these supports, however, it must be clear that the items are appropriate for the teaching context, and for further implicit and explicit instructional objectives, and that they make good use of instructional time. Educators also need to assess their usefulness in promoting educational objectives, and teachers, again, need to be trained to use them. When used properly, guides or annotated texts can ensure a more uniform teacher performance by putting a minimum floor under less qualified teachers.

The best teacher guides are *annotated student texts* since they are easily accessible, relate directly to the lesson material in the book, and ensure good results if the teacher follows them faithfully. They can serve as the textbook for short methods courses for teachers, supervisors, and managers. In annotated guides, instructions (lesson plans) for the teacher appear in the margins surrounding a reduced size copy of the child's text.

If the effective sequences from the present study are incorporated into these instructions, they might appear as follows (parts in brackets give specific details for each individual lesson):

- Objective of the lesson: Today, the students will learn...(specific learning objective).
- Review: To learn this objective/skill the child needs a short review of...(specified prerequisite knowledge—pages where this knowledge exists, or specific problems).
- Presentation of material: Present the new material as follows...(specified steps). Here are some...(specific problems or questions to ask students to see if they are understanding).
- Guided practice: Ask the children to do these... (specified problems, tasks) giving as much individual and group feedback as possible after each. When most children can do the new material fairly well, then go on to:
- Independent practice: Assign the following... (specified set of problems, tasks)
- Homework: For further practice assign... (specified problems).
- Diagnostic tests: Ask children to solve... (specified set of problems).
- Relearning materials: If children have had difficulty with problems...(specified problems) then have them do...(a specified set of relearning problems accompanied by teacher clarification).
- Enrichment materials: While other students are engaged in relearning, have students who already passed the tests do...(a specified set of problems with more difficult applications) on their own.

The lesson is specified step by step to reassure the hesitant teacher. The confident teacher can expand his or her own versions of the lesson. The guides provide a minimum performance standard for teachers who are weak in capabilities and content knowledge. The guides are most useful in systems where teachers are underqualified and professional training is poor. If the lesson plans are carried out conscientiously, they will lead, under normal circumstances, to the expected learning outcomes; these outcomes can be tested with external exams. In addition to using effective methods, the annotated lessons allow for experimentation with learning skills (such as analytical and problem-solving skills) that are thought to be deficient in the existing program.

Instructional Time

Policymakers need to ensure that teachers have *sufficient instructional time* and that local authorities do not arbitrarily cut back that time by starting the school day late or leaving early. School years should be scheduled without major interruptions that require students to relearn curricula. Efforts should be made to compensate for practices, such as double shifting, that shorten the school day. All educators should be made aware of the importance of using instructional time productively.

Findings from the present study on the effective uses of instructional time should serve as a rough

guideline in each subject matter for how many activities are introduced and how much time is spent on each step of the learning sequence in the annotated texts.

There need to be *stable teacher and student attendance patterns*. Policy decisions to stabilize attendance levels will extend the time available for instruction. Teacher absenteeism can be reduced by appointing teachers closer to their homes, increasing supervision over them, preferably by a headteacher or someone nearby who is trained in the management of instruction, and keeping to a minimum the number of permitted leaves. Bureaucratic measures such as salary disbursements need to be arranged so teachers do not leave their classes during school hours.

Instructional Leadership

Instructional leadership needs to be invested in designated personnel who have clearly defined roles and responsibilities. Often this role is best carried out by staff on a number of levels: by principals who supervise teachers on a daily basis, by roving supervisors who visit schools periodically to provide assistance, and by centralized planners who assess learning results and can allocate resources over broad geographical areas. These centralized agencies also need to see that continuing research and development efforts to improve program quality meet the needs of the institutions and programs in their jurisdictions.

Supervision systems can be built around effective practices. To do so, annotated texts, incorporating these practices, can serve as observation proformas so that principals and roving supervisors know immediately whether a teacher is teaching in the prescribed way. Tests can also be administered using problems similar to the diagnostic tests in the annotated texts to determine whether children are learning what they are supposed to learn. Centralized authorities should use the results of these tests to see how well school programs in their districts are faring and to respond with more training and supervision where it is needed.

In summary, the effective practices study has indicated some important areas for improving the quality of education programs.[17] Improving teaching performance is crucial; it has the greatest likelihood of producing results. Previous experience in Pakistan suggests that improvements in teacher performance are more likely to be sustained when there are supportive changes in other areas that affect teaching/learning. This requires attention to such questions as what to change and how, when to bring the changes on line, and how to coordinate them with other changes. To effect improvements in student learning and sustain them over time, this study suggests that change be focused on innovations, such as effective practices, that have some chance of making a measurable impact on classroom learning. To increase the likelihood of their success, innovative practices need to be reinforced with reminders, incentives, and materials that make it rewarding for teachers to use them. To avoid contradiction, all program components need to be coordinated so they support each other, focusing materials, supervision, management, and teaching on the same learning outcomes. During the initial experiments, it is important to develop or improve institutional capacities for research, implementation, and evaluation so that innovations can continue as an automatic function of education departments. Program improvement should be seen as an incremental and continuous process that is never completed.

Notes

1. However, it should be noted that school and population densities vary a great deal in Pakistan. Over half the schools of the country are located in Punjab, while the largest province geographically and the one with the fewest schools, Balochistan, contains less than 10 percent of the population.

2. In the BRIDGES random sample survey of 500 schools, 20 percent of the schools actually had children of both sexes present, even though some of these schools appeared in the record as single sex schools.

3. In one school there was no grade four present.

4. This limits the study's conclusions to the effective practices in the upper grades. A follow-on study using a different design is being conducted on teaching practices in the pre-primary and first grades.

5. An evaluation of the Aga Khan Field-Based Training in Pakistan ends by noting, "One important problem remains in the end: Is the FBTD teaching philosophy, modelled along Western educational theories, the right one for an Islamic society? The understanding of learning can be different across cultures, and cultural differences must be borne in mind in assessing the role of teachers, of textbooks, of memorizing" (Bude, 1990: 132).

6. Supervisor assessment of schools could obviously not be correlated with the class achievement scores for individual teachers since the unit of analysis was different (one of the two teachers studied in each school might turn out to be effective and the other less effective).

7. The BRIDGES survey does not support this conclusion. However, it appears logical that experience in the major language of instruction or one akin to that language would give children an advantage. A hidden factor may be the fact that children of non-local parents residing in Balochistan, who are more likely to speak Urdu or languages akin to Urdu, tend to place more importance on schooling. In some areas of that province they make up sizeable proportions of the school-age populations, particularly in girls' schools.

8. These indicators were measured at the point near the end of the school year when school visits were made. The rates, based on percent of total enrollment for the current year, were for repeaters 7.6 (effective) and 9.0 (less effective) and for dropouts 3.8 (effective) and 6.1 (less effective). The difficulties in ascertaining these rates with any accuracy and the fact that the differences are so small make these rates difficult to use as dependent variables.

9. In some areas official policy states that repetition should not be allowed, yet despite this regulation repetition is still quite common.

10. Homework was the only practice of the sequence that was not observed in a majority of the effective classrooms. However, all the teachers of both samples claimed they gave homework regularly, and in math and science, effective teachers were observed giving homework more frequently than less effective teachers. For these reasons, homework is included as part of the sequence.

11. The achievement tests were written in Urdu, which meant that children who knew that language better had an advantage.

12. This was expressed at a workshop of Pakistani teacher trainers in Abbottabad in June 1990, where the effective practices findings were presented.

13. A BRIDGES survey found that multigrade teachers assigned more independent tasks to students than single grade teachers did and used student monitors for more hours; thus the teacher spent less direct time teaching students. This had a significantly negative impact on student achievement. (Paper prepared by Mr. Islamuddin Baloch for the BRIDGES workshop in January 1990).

14. Under existing circumstances, where test items were so closely connected with textbook material, the more practice children had with textbook-generated material, the better.

15. Ultimately education authorities need to address broad goals of quality. Some of the questions that need to be asked are the following:

- What kind of person should the system produce?
- What basic skills are needed for the adult in this society?
- What are culturally appropriate ways to learn these skills?
- How can the goals be translated into the activities and components of the education system?
- How can they be implemented to ensure that the goals are met?
- What are valid and acceptable indicators that the program has reached these goals?
- What sort of structures need to be created to ensure continuous improvement in the program?

16. See Malik, A. N. and A. Rugh, "Educational Goals, Curricula, and Texts at the Primary Level in Pakistan," 1989 BRIDGES Casual Paper, for more on this lack of connection in curriculum materials, and Rugh, A. and A. N. Malik, "Connectedness: Missing in Education Systems," Harvard Institute for International Development, Education Development Discussion Papers, May 1990.

17. The assumption behind a study such as the one undertaken here is that solutions to local problems can be found within local settings. There are at least four advantages to this approach. First, innovations emerge from conditions similar to those in which they will be implemented. Second, they are effective by local measures of success. Third, the conclusions permit a focused approach which in the initial stages limits change to only what is essential in each educational component to make target improvements. As a result, change is less expensive, and less subject to the resistance of entrenched educational departments. Finally, and perhaps most important for sustaining change, the approach is compatible with "deep structure" cultural assumptions about teaching/learning in the local society.

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